

North Star Computers' New 5.2 Software

by Steven Leibson.

The fine folks at North Star Computers (1440 Fourth Street, Berkeley, CA 94710) have done it again. Release 5.2 of North Star DOS and Basic has several new features that make the software much more powerful. The new release will run on any North Star Horizon or other computer system equipped with a North Star MDS disk subsystem. Versions are available for both single and double/quad density systems. I purchased my copy through Computerland of Denver for \$25. I think it's a steal.

Relocation

First and foremost of the new features is the MOVER program, written in North Star Basic. This program will relocate the DOS, Basic and the utility programs of Release 5.2 to any start address. The big advantage for North Star users is getting an extra 8K of memory space for programs.

Since its introduction, users have complained about North Star's DOS starting at address 2000 (hex). The lower 8K of memory had to go unused. Since the disk controller was located at E800 (hex) there was only about 28K of memory available for Basic programs. North Star did offer relocated operating systems on special order.

Release 5.2 allows you to relocate any of the utility programs in the standard North Star software system to any location. By relocating DOS to address 100 (hex) and Basic to E00 (hex), you can get an extra 8K bytes of memory. If you have CP/M on your North Star, you have memory down there anyway. Now you can take advantage of it for both operating systems.

Unfortunately, the single-density version of Release 5.2 cannot be relocated, as shipped from North Star. This is because there are absolute-address references in the single-density boot ROM that require the DOS to be at location 2000 Hex. John Dvorak (704 Solano

Ave., Albany, CA 94706) is marketing a utility program that does allow relocation of single-density 5.2. This is accomplished by including a relocatable version of the boot ROM in the disk file with the DOS.

System Software Errata

Before we look at the new features of Release 5.2 in detail, there are a few errors in the North Star System Software Manual to correct. I'll cover them so you won't have to buy a copy of the new DOS just to get the corrections.

1. On page A-2 of the DOS section, file directory entry bytes 10-11 are described as, "number of blocks in file," but should be described as "number of sectors in file." For single-density systems, sectors and blocks are equivalent. Double and quad-density systems pack two blocks per sector.

2. On page G-2 of the DOS section, one of the comments before DCOM reads "ACC=NUMBER OF BLOCKS." It should read "ACC=NUMBER OF SECTORS."

3. After a call to DCOM, the stack pointer will be left unchanged whether DCOM exited via the return address on the stack, or via the HDERR vector. This should be noted on page G-2 of the DOS section.

4. When performing DOS personalization, it is important to note that DOS 5.2DQ loads in two parts:

Sectors 4-8 load into locations 100-AFF hex.

Sectors 8-9 load into locations A00-DFF hex.

Usually this means that when loading an image of DOS into memory to modify using the LF command, the data in sectors 8 and 9 of the DOS file will be loaded 100 hex bytes lower than their operating address would indicate. This should be noted on page F-2 of the DOS section.

New DOS Features

The first new feature in the DOS is the acceptance of

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lower-case commands. I don't find this to be a major feature because all my file names are in upper-case letters. Unlike CP/M, the case of the file names matters.

Release 5.2 DOS, so I still keep the alpha-lock key down on my keyboard and continue to ignore lower case for commands.

Other new features in the DOS are definitely designed with third party assembly-level software in mind. There are two new entries in the I/O jump table to check for device status. One is for input devices, and the other is for output devices. The routines associated with these locations accept the device number in the accumulator (0 through 7) and return the Z flag true if the specified device is ready. Ready for an input device means that a byte is available from the device. Ready for an output device means that another byte may be output.

The two status calls in the DOS mean that programs need no longer know how the I/O of any given system works. To find out if the device is ready, one standard call is all that is required. The same has always been true for input and output in North Star software. With the addition of status routines, the I/O can be truly independent.

A big change in the DOS has been made to the disk routines. North Star users have previously not been able to use interrupts and the disk system at the same time. The North Star disk routines are time critical and cannot be interrupted. Now interrupts are unconditionally disabled during disk transfers and conditionally enabled when disk access is complete.

A routine called OFTEN has always been called while disk transfers are taking place. By combining this routine with interrupts during the times the disks aren't being used, keyboards and other input devices may be interrupt driven.

A new routine in the DOS is used with the addition of interrupts. North Star's RAM boards have the ability to interrupt if a parity error is detected. Since the software previous to Release 5.2 did not allow interrupts, this feature was not used. Instead, an LED inside the computer lit up if there was a parity error, a feature useless for those of us who keep the cover on the computer most of the time.

Interrupts may now be used to monitor parity errors. The new parity routine will send the message "RAM PARITY ERROR" to the console (device 0) if an error is detected. If you wish to use interrupts for other purposes, then the DOS routine written by North Star will have to be modified.

DLOOK is a routine in the DOS that allows you to find the location of a file. Correct file name syntax had to be used or the routine wouldn't work. DLOOK has had error checking for file name syntax added. If the syntax is wrong, a zero is returned in the accumulator. Otherwise, the drive number (1 through 4) is returned, indicating which disk has the requested file.

The disk access routines for double and quad-density machines have been rewritten. Disk access is now noticeably faster. North Star suggested that this could be seen during copy operations. I found this to be true. Finally, a byte has been added to point to the location of the disk controller. Just as with the DOS, North Star has provided non-standard start addresses for the disk

controller ROM. One way of rebooting a North Star is to jump to the first address in this ROM. A pointer allows a standard location to be accessed to find out where the reboot location is. Unfortunately, since the DOS need no longer start in a standard location, this byte may be hard to find.

New Utility Programs

One problem a user faces is where to start when the system won't wake up. Is the problem in the hardware, the new I/O routines just added, or in the software from the manufacturer? North Star has added a program to their Release 5.2 disk that runs a checksum on the entire diskette. This allows a dealer, who presumably has a functioning system, to check out the diskette and verify its integrity. This assumes you have such a local dealer.

Another problem in maintaining a system is verifying the RAM. North Star has provided two copies of a RAM test program written especially to test North Star RAM boards. The difference in the programs is where they are located in memory. The test is a six-phase checkout of RAM operation. The display shows individual chips, so it is easy to locate the troublemaker.

The test supplied by North Star requires the console to be attached to the Horizon serial console port. Randy Reitz suggested searching the RAM test program for all outputs to the serial port. This is done with the monitor commands:

```
> LF RAMTEST 5000  
> SM 5000,400 D3 2
```

These commands will identify the three locations that output to the console. If you use a different I/O port for the console, the only bytes that will need to be changed are the 2's that specify the serial port. My memory-mapped video display requires more than a simple OUT command, so I have not yet decided how to get the RAMTEST routines working on my system.

New Features In Basic

Several new features have been added to North Star Basic, the first of which I remember asking North Star for myself. The output routines in Basic have always been too smart. Each of the output devices has a line length. If enough characters are output to a device to exceed the line length defined for that device without sending it a carriage return and line feed, good old Basic sent those characters out for you. There was no way to disable this feature.

The reason I wanted to disable automatic transmission of carriage return and line feed was because I was building an editor in Basic. I found that if you made enough mistakes and used the backspace enough times, the cursor would automatically jump to the next line. It took a long time to figure out that the line length was being exceeded.

My solution for this problem was to periodically go into the print head table where Basic keeps the current character count for each output device, and to zero out the count using the FILL statement. That stopped the automatic character generation, but placed obscure lines of code in my program.

The upgraded LINE statement in Basic takes an optional third argument. If zero, the automatic feature is suppressed. Otherwise carriage return and line feed are generated as before.

There are two new functions and a modification to the WRITE statement for dealing with disk files. FILESIZE(N) returns the size of the file specified by N in blocks. FILEPTR(N) will tell you where the file pointer is in file N. Many disk oriented programs in Basic had to keep track of this, so FILEPTR is a welcome addition. WRITE can now be used to directly set the file pointer using the syntax:

```
WRITE #N %P, NOENDMARK
```

This syntax also allows resetting of the file pointer to the beginning of the file without closing and reopening it.

DOS Bugs Fixed

All software has bugs, and North Star's is no exception. Release 5.2 documentation has a list of bugs that have been eradicated. The CR (create file) DOS command now fails if an improperly formed file name is given. This is undoubtedly tied to the error checking added to DLOOK mentioned above.

The IN (initialize) command can now use the read-after-write option. Use of read-after-write during media initialization will serve as a media verification in addition to the initialization. It's always nice to know that the diskette you are about to commit your software to has just passed some kind of test.

"Hard disk error messages are now routed to device 0." The documentation tells you this, but I don't know where they went before. Error messages have always appeared on console.

Single-density DOS has been corrected to accept carriage returns from device 0 when paging causes a stop during a directory listing. After pressing return in response to the message "PRESS RETURN TO CONTINUE," a carriage return and line feed are output to clear the line. Auto-start can now be selected in single-density without using a "fresh" copy of the DOS. If auto-start is selected, the initial message sign-on message is not displayed. That's good news for writers on turnkey software. They will now be in full control of the display screen.

A big bug I could never get verification on has been fixed in double/quad-density DOS. It will now boot correctly, regardless of what is in memory prior to loading the DOS. Sometimes after using CP/M or other programs, I couldn't get North Star DOS to load until I turned my system off and then on again. I believe that I was experiencing this bug. So far, I haven't seen it using Release 5.2. (According to Randy Reitz, Release 5.1 may be fixed by changing location 203B hex to 00 and saving the patched DOS.)

Some bugs in the double/quad-density directory listing have also been fixed. A hard disk error will no longer cause the directory listing to hang-up forever. The directory listing will no longer destroy software that has overlaid the high part of DOS starting at location 2A00 (hex) if the DOS starts at 2000 (hex). OFTEN will now be called even for drives with fast stepping capability.

Utility Bugs Fixed

The CO (copy disk) utility has also been upgraded. CO will not proceed if a disk has overlapping files. It will no longer offer to convert a double-density-only diskette to double density, and it will now handle all density mismatch errors properly.

CF, the copy file utility, can now handle improper file names like the CR command. It can also handle density mismatches like the CO utility. Small files can now be copied into large files.

Basic Bugs Fixed

Basic has also had bugs fixed. CREATE had an obscure bug that affected other statements. This has been corrected. (I never got involved enough to know what the bug was.) Numeric overflows will be handled correctly when dividing large numbers by very small numbers. (I never saw that one either.) The user-defined functions (UDF's) precluded the use of ELSE when they appeared in a THEN clause. ELSE is now permitted after a UDF. DEF statements may now have other statements following on the same line.

Getting 5.2 Running

I had very little trouble getting Release 5.2 up and running once I decided to do it right. All of my I/O routines had to be rewritten since the DOS now starts at location 100 (hex). This forced me to finally put the routines in an assembler source file so that they would be easy to modify in the future. I also had to add the new status routines for my devices.

That won't be necessary if you have a Horizon with I/O as North Star designed it. If your console uses the first serial port and you only use the Horizon's serial and parallel ports for I/O, you can use the DOS as supplied. Those of you who have non-standard Horizon I/O or MDS subsystems in "foreign" computers will have to write new I/O drivers as I did. If you've done this before, you should have no problem.

One other problem I had was attributable purely to "pilot error." The double/quad-density DOS is supplied in double density configuration. I left it that way and got a lot of file errors on old files before I realized that I needed to change the CONFIG byte to let the software know I had a quad-density system.

After the problems listed above were solved, I was able to run old Basic programs with the new system, without fail. The newly relocated DOS conveniently starts at the beginning of CP/M's TPA (transient program area).

Recommendation

The status of North Star DOS is uncertain now that North Star is also offering CP/M for their systems. I still do not favor CP/M for my program writing because I'm not able to use North Star Basic under CP/M.

If you are still using North Star DOS, get Release 5.2. It's faster, has fewer bugs (especially that boot problem), and more features. The cost is low compared to what other operating systems are going for, and you get a language (Basic). If you have a North Star system, Release 5.2 will give you more flexibility and ease of use.